



## Salinity

surveys conducted in 1999-2000 and 2001-2002. Additionally, the percentage of the state's estuarine waters that were considered to be oligohaline ( $\leq 5$  ppt) or mesohaline ( $> 5$  to  $< 18$  ppt) was 28% and 29% for tidal creeks and open water habitat, respectively, compared to  $< 11\%$  for either habitat in the previous two surveys (Figure 3.2.1). This reflects the effects of increased rainfall following a four year record drought. While greater rainfall might be expected to increase the mean range of salinities observed at the sites sampled over a 25-hr period, this was not observed. The average salinity ranges observed were 4.2 ppt among the tidal creek sites and 6.8 ppt among the open water sites, which were similar to the average ranges observed in previous survey periods (data online). However, three tidal creek sites (RT032178,

RT042068, RT042084) and four open water sites (RO036043, RO036052, RO036058, RO046081) had salinity ranges  $\geq 20$  ppt, which may represent stressful conditions to many species. Until additional data are available, no criteria have been established by SCECAP to identify stressful conditions using salinity. The sites having these salinity ranges likely reflect the effects of major rainfall events that occurred just before or during our deployment of the datasondes.

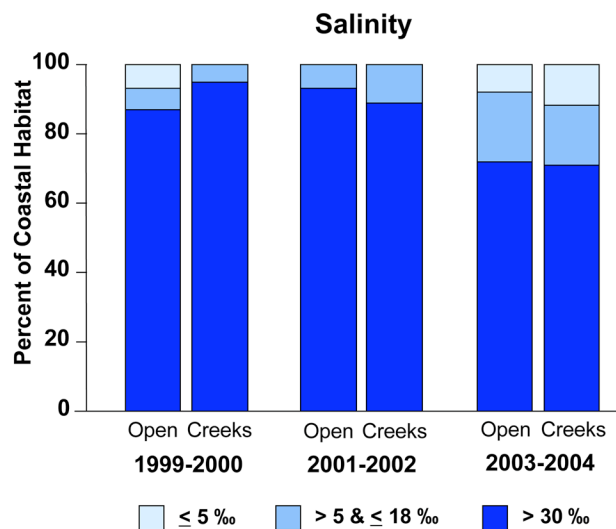


Figure 3.2.1. Comparison of the percent of the state's coastal habitat that represented various salinity ranges during the three survey periods conducted from 1999-2004.

The average difference between surface and bottom salinity measurements taken during the primary station visit was 0.3 ppt in tidal creeks and 0.9 ppt in open water areas. Only one tidal creek site had a difference  $> 5$  ppt, and surface to bottom differences at the majority of creek sites were  $< 1$  ppt (data online). This was also the case for open water stations, with only four stations having  $> 5$  ppt variation in salinity.

### Dissolved Oxygen

Low dissolved oxygen (DO) conditions can limit the distribution or survival of most estuarine biota, especially if these conditions persist for extended time periods (see Diaz and Rosenberg, 1995; USEPA, 2001 for reviews). Dissolved oxygen criteria established by the SCDHEC for "Shellfish Harvesting Waters" (SFH) and Class SA saltwaters are a daily average

not less than 5.0 mg/L with no values less than 4.0 mg/L (SCDHEC, 2004). Class SB waters should have no values less than 4.0 mg/L. The SCECAP program was designed to sample only during a summer index period when DO levels are expected to be at their lowest. As a result, it was expected that DO measurements collected in this program probably represent short-term worst-case conditions that may not reflect conditions during other seasons or longer time-averaging periods. Although that expected pattern was not reflected in our comparison of summer only versus 12-month measurements of dissolved oxygen (Box 3.2.2), SCDHEC requires year-round monthly measurements for their regulatory purposes. Therefore SCECAP data should be used only to identify coastal habitats where DO levels may be limiting. Based on the state water quality standards, mean or instantaneous DO concentrations  $> 4$  mg/L are considered to be good for summer time periods, values  $< 4$  mg/L and  $\geq 3$  mg/L are considered to be fair (i.e., contravenes one portion of the state standards), and average or instantaneous measures  $< 3$  mg/L are considered to be poor and potentially stressful to many invertebrate and fish species.

The average bottom DO concentration at the open water stations during the 2003-2004 survey was 5.2 mg/L, with approximately 90% of the state's open water habitat having an average DO  $> 4.0$  mg/L based on the 25-hr instrument deployments (Figure 3.2.2; data online). These conditions were very comparable to DO conditions observed in the previous survey period (Van Dolah *et al.*, 2004a). Only two open water sites (representing approximately 3% of the state's open water habitat) had an average DO  $< 3.0$  mg/L (RO036043, RO046076). These sites were in the South Edisto River and the North Santee River, respectively (Appendix 2). The latter site also had an instantaneous bottom DO of 2.3 mg/L, with a surface water DO concentration of 3.1 mg/L.

The average bottom DO concentration observed at tidal creek sites was 4.8 mg/L, with 85% of this habitat having an average DO value  $> 4.0$  mg/L. The average DO value observed among the tidal creek sites was significantly lower than the average DO observed among the open water sites ( $p = 0.003$ ), but this difference is not likely to be biologically meaningful since the average difference was  $< 0.5$  mg/L and both